#### TOSHIBA Photocoupler Photorelay

# **TLP172G**

Modem·Fax Cards, Modems in PC Telecommunications

**PBX** 

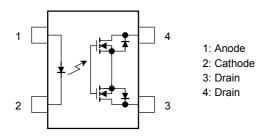
Measurement Equipment

The Toshiba TLP172G consists of an aluminum gallium arsenide infrared emitting diode optically coupled to a photo-MOSFET in a SOP, which is suitable for surface mount assembly.

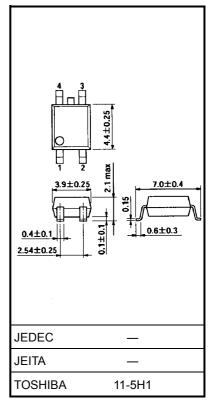
The TLP172G is suitable for the modem applications which require space savings.  $\,$ 

- 4-pin SOP (2.54SOP4): Height = 2.1 mm, Pitch = 2.54 mm
- 1-Form-A
- Peak Off-state voltage: 350 V (min)
- Trigger LED current: 3 mA (max)
- On-state current: 110 mA (max)
- On-state resistance:  $35 \Omega$  (max t < 1 s)
- On-state resistance:  $50 \Omega$  (max continuous)
- Isolation voltage: 1500 Vrms (min)

### Pin Configuration (top view)



Unit: mm



Weight: 0.1 g (typ.)

## Maximum Rating (Ta = 25°C)

Characteristics		Symbol	Rating	Unit	
	Forward current	l <sub>F</sub>	50	mA	
	Forward current derating (Ta ≥ 25°C)	ΔI <sub>F</sub> /°C	-0.5	mA/°C	
LED	Reverse voltage	$V_{R}$	5	V	
	Junction temperature	Tj	125	°C	
	Off-state output terminal voltage	V <sub>OFF</sub>	350	V	
	On-state current	I <sub>ON</sub>	110	mA	
Detector	On-state current derating $(Ta \ge 25^{\circ}C)$	Δl <sub>ON</sub> /°C	-1.1	mA/°C	
	Junction temperature	Tj	125	°C	
Storage temperature range		T <sub>stg</sub>	T <sub>stg</sub> –55~125		
Operating temperature range		T <sub>opr</sub>	T <sub>opr</sub> –40~85		
Lead soldering temperature (10 s)		T <sub>sol</sub>	260	°C	
Isolation voltage (AC, 1 min, R.H. $\leq$ 60%) (Note 1)		BVS	1500	Vrms	

Note 1: Device considered a two-terminal device: LED side pins shorted together, and detector side pins shorted together.

# **Recommended Operating Conditions**

Characteristics	Symbol	Min	Тур.	Max	Unit
Supply voltage	$V_{DD}$	_	_	280	V
Forward current	I <sub>F</sub>	5	7.5	25	mA
On-state current	I <sub>ON</sub>	_	_	100	mA
Operating temperature	T <sub>opr</sub>	-20	_	65	°C

# **Electrical Characteristics (Ta = 25°C)**

	Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
	Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	1.0	1.15	1.3	V
LED	Reverse current	I <sub>R</sub>	V <sub>R</sub> = 5 V	_	_	10	μΑ
	Capacitance	C <sub>T</sub>	V = 0, f = 1 MHz	_	30	_	pF
Detector	Off-state current	l <sub>OFF</sub>	V <sub>OFF</sub> = 350 V	_	_	1	μΑ
Detector	Capacitance	C <sub>OFF</sub>	V = 0, f = 1 MHz	_	30	_	pF

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# **Coupled Electrical Characteristics (Ta = 25°C)**

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Trigger LED current	I <sub>FT</sub>	I <sub>ON</sub> = 110 mA	_	1	3	mA
Return LED current	I <sub>FC</sub>	I <sub>OFF</sub> = 100 μA	0.1			mA
On-state resistance	R <sub>ON</sub>	$I_{ON} = 110 \text{ mA}, I_{F} = 5 \text{ mA}, t < 1 \text{ s}$		25	35	Ω
	NON	I <sub>ON</sub> = 110 mA, I <sub>F</sub> = 5 mA, continuous	_	35	50	52

# **Isolation Characteristics (Ta = 25°C)**

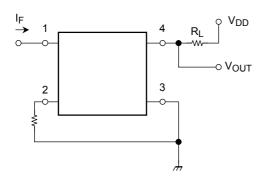
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Capacitance input to output	CS	V <sub>S</sub> = 0 V, f = 1 MHz	_	0.8	_	pF
Isolation resistance	R <sub>S</sub>	V <sub>S</sub> = 500 V, R.H. ≦ 60%	$5 \times 10^{10}$	10 <sup>14</sup>	_	Ω
		AC, 1 min	1500	_	_	Vrms
Isolation voltage	$BV_S$	AC, 1 s, in oil 3000	3000	_	VIIIIS	
		DC, 1 min, in oil	_	3000	_	Vdc

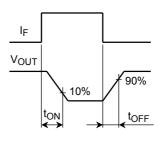
# **Switching Characteristics (Ta = 25°C)**

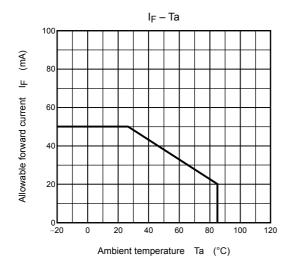
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Turn-on time	t <sub>ON</sub>	$R_L = 200 \Omega$	_	0.3	1	ms
Turn-off time	toff	$V_{DD} = 20 \text{ V}, I_F = 5 \text{ mA}$ (Note 2)	_	0.1	1	1113

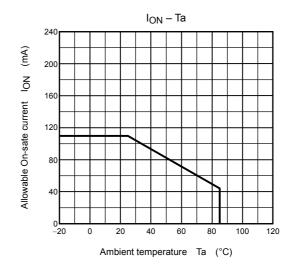
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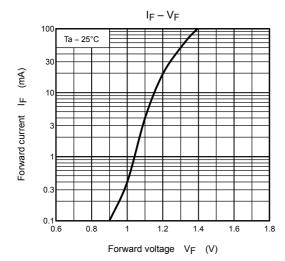
Note 2: Switching time test circuit

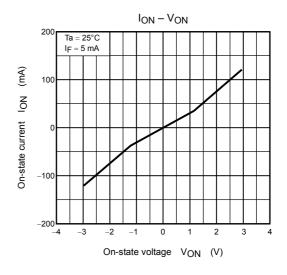


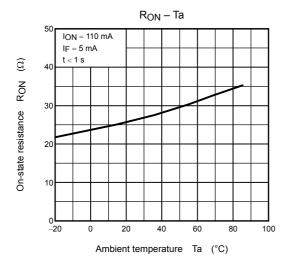


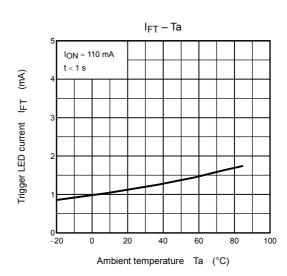


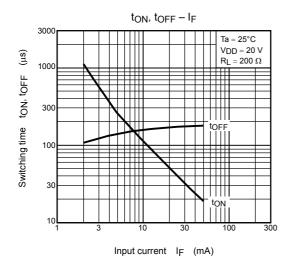


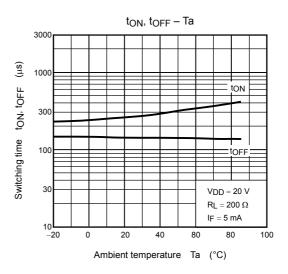


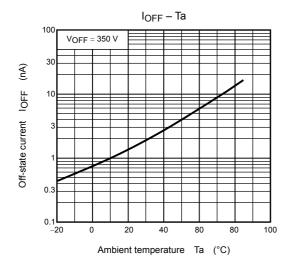












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